

Ultrasonic cleaning for Anilox Rollers

As ultrasonic cleaning of ceramic laser engraved Anilox and gravure rollers gains increasing acceptance as the preferred method of frequent, reliable cleaning, so too have the fears been voiced by printers who have experienced cell damage. To cut through the confusion, and to assure the print industry that ultrasonic cleaning can be undertaken with complete confidence, Nigel Haddock, of Caresonic, explains how the most common problems experienced to date may be successfully overcome.

Firstly, it must be admitted that conventional ultrasonic tanks - even those that claim to feature a frequency modulation system - can prove unsuitable for the safe cleaning of complex ceramic anilox rollers. The danger lies in damage that may be caused by the creation of hot spots and dead spots within the cleaning liquid - known as nodes and anti-nodes. These occur when sound waves generated at the transducers, travel to the top of the liquid and, on returning, collide with the next wave. This creates a hot spot of intense cavitation, below and above which there is formed an area of less cavitation - a dead spot. These hot spots are potentially harmful to ceramic Anilox roller cells.

In the early days it was common practice to mechanically move sensitive components up and down the tank - or by rotating a roller in the tank - and thus attempting to avoid damage. As the frequency of operation dictates where the hot spot would be, some ultrasonic cleaning equipment producers tried to design ways of varying the frequency.

The most usual way was to use the incoming mains cycle to influence the inductance of the frequency control coil - a system in widespread use today. However, this approach is not entirely acceptable in that frequency may be affected by mains fluctuation and power surges, leading to lack of stability.

To eradicate this entire problem of hot spots, Caresonic bases all its Cellsonic ultrasonic cleaning systems on the incorporation of an FMG 600 generator of a patented design, unique to the company. It provides a pre-determined frequency sweep circuit, operated by its own, independent, low voltage supply, which maintains uniform distribution divorced from line fluctuations. This results in the hot spot being moved up and down 100 times a second, thus preventing damage occurring due to a power concentration in one point of the roller.

A further benefit of pre-determined frequency sweep is that it makes the ultrasonic tank totally uniform in cavitation terms throughout the liquid, giving a consistent clean to all rollers.

Another important factor in ensuring successful, safe ultrasonic cleaning relates to the need for the centre frequency to remain constant during changes in transducer temperature or the effect of a heavy roller being placed in the tank. Caresonic has ensured this stability by designing and installing an auto tracking circuit, which compensates for external changes and maintains the centre frequency.

This auto tracking circuit also prevents the transducer elements hitting their resonance and drawing an unequal amount of power - possibly leading to overdrive. In such cases, the power drawn by an individual device could double, which would further add to damage of the cell walls of the roller.

It is also essential to ensure that the transducers do not run hot internally as this could lead to uneven distribution and components failure. Again, Caresonic has solved this potential hazard by commissioning high quality bronze conductors, purpose-built to a registered design, and employs special assembly methods, which prevent internal heating problems.

All Caresonic, Cellsonic cleaning systems provide frequency of operation of 30 kHz +/- 2, with secondary bar frequencies 10 - 100 kHz.

If simple precautions are taken to study the technical characteristics of an ultrasonic cleaning system and to insist on the provision of pre-determined frequency sweep circuit, then no more effective or safer means of ceramic Anilox roller maintenance can be found. Cell damage - which quite rightly, greatly concerns both printers and roller manufacturers - can be considered a risk of the past and this cost efficient, sure and successful method may be chosen with complete confidence.

With over 25 years experience in the market, and with over 2000 Cellsonic ultrasonic cleaning systems installed world-wide, Caresonic has provided the patented design features outlined above in each machine it has constructed.